Amendments to the Drawings:

The attached 13 sheets of drawings include changes to Figs. 1-10:

Sheet 1, which includes Fig. 1A, replaces the sheet that includes Fig. 1A.

Sheet 2, which includes Fig. 1B, replaces the sheet that includes Fig. 1B.

Sheet 3, which includes Figs. 2A-2C, replaces the sheet that includes Figs. 2A-2C.

Sheet 4, which includes Figs. 3A-3C, replaces the sheet that includes Figs. 3A-3C.

Sheet 5, which includes Fig. 4, replaces the sheet that includes Fig. 4.

Sheet 6, which includes Figs. 5A-5C, replaces the sheet that includes Figs. 5A-5C.

Sheet 7, which includes Figs. 5D-5F, replaces the sheet that includes Figs. 5D-5F.

Sheet 8, which includes Figs. 6A-6G, replaces the sheet that includes Figs. 6A-6G.

Sheet 9, which includes Figs. 6H-6N, replaces the sheet that includes Figs. 6H-6N.

Sheet 10, which includes Figs. 7A-7C, replaces the sheet that includes Figs. 7A-7C.

Sheet 11, which includes Fig. 8, replaces the sheet that includes Fig. 8.

Sheet 12, which includes Figs. 9A-9C, replaces the sheet that includes Figs. 9A-9C.

Sheet 13, which includes Fig. 10, replaces the sheet that includes Fig. 10.

Attachment: 13 replacement sheets.

REMARKS

Claims 1 – 47 were pending in the application. After entry of the amendments made herein claims 28-31, 33-38 and 40-52 are pending. Claims 1 – 27, 32 and 39 have been cancelled. Claims 28, 29, 30, 31, 40, 41, and 44 – 47 have been amended. New claims 48 - 52 have been added. No new matter has been added by virtue of the new claims or amendments, support being found throughout the specification and claims as originally filed.

Specifically, support for the amendment to claims 28 and 29 can be found at paragraphs [0005] and [0006] of the published application, as well as in Figure 1A. Support for the new claims can be found in Figure 1D and paragraph [0191].

I. Objections

Drawings

The Examiner has objected to the Drawings filed on October 8, 2003. Applicants herein submit replacement drawing sheets to address the Examiner's objection. Thus, Applicants respectfully request withdrawal of the objection to the drawings.

II. Oath/ Declaration

The Examiner alleges that "it does not state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56." (Office Action, p.2). .

Applicants will submit a new oath under separate cover.

Claim Rejections

35 U.S.C. §102(e)

Claim 28 was rejected under 35 U.S.C. 102(e) as being anticipated by Kellog et al. (US 2002/0151078; the '078 reference herein). Applicants respectfully traverse the rejection.

In order to anticipate a claim, each and every element of the claim must be found in a single reference. This is discussed in the Manual of Patent Examining Procedure § 2131:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The teaching of the '078 reference under 102(e) does not anticipate the claimed invention. Specifically, the '078 reference neither teaches nor suggests a system comprising a macroscale device which is interfaced with a microscale device using double-sided tape **to form a stable association between the microscale device and the macroscale device**.

Instant claim 28 teaches a system comprising a macroscale device which is interfaced with a microscale device using double-sided tape to form a stable association between the microscale device and the macroscale device, wherein the double sided tape comprises a first adhesive surface which associates with the macroscale device and a second adhesive surface which associates with the microscale device, wherein the microscale device has at least one microchannel. Applicants point out that the specification teaches at paragraph [0159] that " 'a stable association' is one that provides a suitable functional interface **between the macroscale and the microscale device**."

The Examiner argues that the '078 reference "discloses a macroscale device, which is interfaced with a microscale device at an interface…using double sided tape." (Office Action, p.3). The Examiner argues further that "the limitation 'an interface' does not positively recite that this interface is between the two devices." (Office Action, p.3). Applicants disagree.

As pointed out above, the instant claims recite a system comprising a macroscale device which is interfaced with a microscale device using double-sided tape to form a **stable association** between the microscale device and the macroscale device. As pointed out above, the instant specification at paragraph [0159] clearly teaches that the term "stable association" defines the functional interface between the macroscale and the microscale device. Furthermore, claim 28 was herein amended to recite that the double-sided tape has a first adhesive surface which associates with the macroscale device and a second adhesive surface which associates with the microscale device.

The Examiner points to paragraphs [135] and [0138] of the '078 reference to support the argument that the '078 reference discloses a macroscale device interfaced with a microscale device using double-sided tape. However, paragraphs [0135] and [0138] simply teach that a sealing film with **one adhesive layer**, not a double sided tape is used to cover the holes and channels in the **top of the microfluidic layer** as claimed. Applicants refer to paragraphs [0135] and [0138] below:

> The sealing film of as shown in FIG. 3 was made by applying a double-sided tape to a thin sheet of heat-stabilized polyester (mylar). A section of mylar bonded to tape was cut from the combined sheet to the correct shape, **leaving one adhesive face of the tape for application to the macrofluidic layer**. [0135]
>
> **Sealing film with adhesive exposed was first applied to the upper surface of the macrofluidic layer** so that it completely covered the holes and channels 207, 208, 211, 218. Final assembly was completed by forming a reversible, conforming seal between the PDMS microfluidics layer and the bottom surface of the macrofluidic reservoir layer 201 **made through simple physical contact of the two components.** This seal is based on physical adhesion forces alone--van der Waals attraction forces and potentially static electrical charge present on the surfaces--and was sufficient to seal the disc against leakage due to the centripetally-induced pressures used. [0138]

Applicants further direct the Examiner to Figure 1, below, which shows a microsystems platform of the invention, and the description in paragraph [0084].

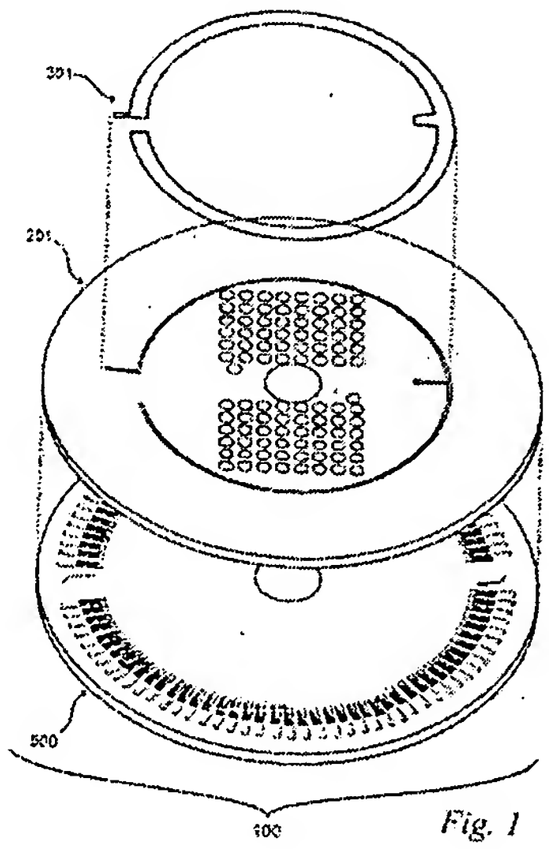

Fig. 1

In FIG. 1, platform 100 is composed of at least 3 component layers. A reservoir layer 201 having features on the lower face, or both the upper and lower faces, is used. **In cases where there are fluidic channels on the upper surface, a sealing film 301 is used to enclose those channels**. The "lower" surface of the reservoir layer 201 is bonded to a microfluidics layer 500.

As taught by the Figure and accompanying description, a sealing film, not double sided tape, is used to cover the holes and channels in the **upper surface**. Nowhere in the '870 reference is there teaching or suggestion of a system comprising a macroscale device which is interfaced with a microscale device using double-sided tape **to form a stable association between the microscale device and the macroscale device**.

Accordingly, Applications request withdrawal of the rejection and allowance of the claims.

35 U.S.C. §103

Claims 28 – 33 and 36 – 43 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over O'Connor et al. (US 6,536,477; the '477 reference herein). Applicants respectfully traverse the rejection.

Instant claim 28 was described above. Claim 29 recites a system comprising a macroscale device which is interfaced with a microscale device using transfer tape to form a stable association between the microscale device having at least one microchannel and the macroscale device, wherein the transfer tape comprises a backing to which an adhesive surface is separably attached and wherein a bond between the adhesive and the backing is weaker than a bond between the adhesive and the macroscale or microscale surface.

The Examiner argues that the '477 reference teaches "a macroscale device (the pumping and valving mechanisms, col 6, lns. 39 – 42) which is interfaced with a microscale device at an interface…using double-sided tape, and a macroscale device which is interfaced with a microscale device at an interface using transfer tape." (Office Action, p.4). The Examiner argues further that "the limitation 'an interface' does not positively recite that this interface is between the two devices." (Office Action, p.4). Applicants disagree.

The '477 reference fails to teach a macroscale device which is interfaced with a microscale device using double-sided tape or transfer tape to form a stable association between the microscale device and the macroscale device. As discussed above, the instant specification at paragraph [0159] clearly teaches that the term "stable association" defines the functional interface between the macroscale and the microscale device.

The '477 reference simply teaches microfluidic coupling devices and modular systems of microfluidic components (see e.g. col 1, lns. 61 – 66; col 3, lns. 11 - 14). Applicants point out Figures 1 – 5, all of which teach microfluidic coupling devices (inlet port coupled to an outlet port of a microfluidic device). At best, the '477 reference uses

adhesive to interface a microfluidic device with another microfluidic device, for example at col 5, lines 14 - 21:

In a preferred embodiment, the bottom surface 28 of the microfluidic coupler near the inlet port 25 is covered with an adhesive material that allows the inlet port to be connected to the outlet port of a microfluidic device. Alternatively, the surface 28 can be non-adhesive and the surface of the microfluidic device to be coupled to can be adhesive. In an alternative embodiment, both surfaces are adhesive.

Accordingly, the '477 reference teaches that microfluidic devices can be coupled to other microfluidic devices with an adhesive material on the microfluidic coupler.

Moreover, the '477 reference provides no teaching or motivation to couple the microfluidic device with a macrofluidic device. In fact, the microfluidic devices taught by the '477 reference are not coupled to a macrofluidic device in a manner according to the instant invention, but rather are only used with the modular microfluidic systems. The Examiner points out col. 6, lns 61 – 66; however nowhere in the cited art is there reference or motivation to adhere a macrofluidic device to the microfluidic module. In fact, at col 7 the microfluidic device as taught in operation does not include any association between a macrofluidic and microfluidic device, but rather teaches an external syringe pump (the macrofluidic device) that injects the sample into the microfluidic device:

In operation, a sample plug is injected at the inlet port 40 using a syringe pump at a constant flow rate. A fluidic impedance 60 is constructed immediately after the inlet to control the initial fluid flow. The fluid then passes into channel 50 and fills the channel until it reaches impedance 62.

For the reasons set forth above, the '477 reference does not render the current claims obvious. Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of the claims.

Claims 34 and 35 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over O'Connor et al. (US 6,536,477; the '477 reference) in view of Pfost (US 5,104,621; the '621 reference herein). Applicants respectfully traverse the rejection.

Instant claim 34 depends from claims 28 and 29 described above, and recites that the microchannels connect to reservoirs in the microfluidic device and where the center-to-center distance of each reservoir corresponds to the center-to-center distance of the wells in the industry-standard microtiter plate.

For the reasons set forth above, the '477 reference in combination with the '621 reference does not render the current claims obvious. The addition of the '621 reference does not cure the defects of the '477 reference.

Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of the claims.

Claims 44 and 45 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over O'Connor et al. (US 6,536,477; the '477 reference) in view of Crandall et al. (US 6,352,766; the '766 reference herein). Applicants respectfully traverse the rejection.

Instant claim 44 depends from claims 28 and 29 described above, and recites that at least one adhesive side of the tape surface is covered by a release liner prior to adhering the device surface of the macroscale or microscale device.

For the reasons set forth above, the '477 reference in combination with the '766 reference does not render the current claims obvious. The addition of the '766 reference does not cure the defects of the '477 reference.

Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of the claims.

Claims 46 and 47 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over O'Connor et al. (US 6,536,477; the '477 reference) in view of DiZio et al. (US 6,455,152; the '152 reference herein). Applicants respectfully traverse the rejection.

Instant claim 46 depends from claims 28 and 29 described above, and recites that the adhesive on the tape is patterned onto a backing. Instant claim 47 depends from claims 28 and 29 described above and recites that at least one surface of the tape comprises portions that are coated with adhesive and portions that are not coated with adhesive.

For the reasons set forth above, the '477 reference does not render the current claims obvious. The addition of the '152 reference does not cure the defects of the '477 reference.

Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of the claims.

CONCLUSION

In light of the above remarks, Applicants respectfully request early consideration and allowance of the subject application.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned attorney would appreciate the opportunity to do so.

The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment to Deposit Account No. 04-1105.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: October 31, 2007

Respectfully submitted,

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